REMARKS

In this Amendment, Applicant has added new Claims 14 – 27 to specify different embodiments of the present invention and overcome the rejection. It is respectfully submitted that no new matter has been introduced by the amended claims and specification and added claims. All claims are now present for examination and favorable reconsideration is respectfully requested in view of the preceding amendments and the following comments.

REJECTIONS UNDER 35 U.S.C. § 103:

Claims 1 – 3, 5 and 6 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over New (US 733,330) in view of Schumacher (DE 100 20 491.0, as translated in US Pub. 2002/0175022). Claims 4 and 7 – 13 have been rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over New (US 733,330) in view of Schumacher (DE 100 20 491.0, as translated in US Pub. 2002/0175022) further in view of Murray (US 3,219, 144).

Applicant traverses the rejection and respectfully submits that the embodiments of present-claimed invention are not obvious over New in view of Schumacher and further in view of Murray. There are significant differences between the present invention and cited references. According to MPEP 2143.01, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). According to MPEP 2143.03, to establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Neither Schumacher nor NEW teach a throttling device which response to pressure of air flow, Schumacher and NEW in combination cannot teach or suggest the embodiment of Claim 1 of this application. More specifically, there are two forces acting on the throttling member (which is Closure member # 14) of Schumacher (US2002/0175022); one force is from separate actuating element #16 and the other force is from air flow. The force of separate actuating element 16 comes from the pressure difference between the intake pipe of the motor vehicle engine (or vacuum pump) and atmosphere (page 3, [0059]—[0060]); it is not from air flow. The force of air flow comes from "counter-pressure p" (page 3, [0057]□line 3); but it does not come from pressure. "[T]he force of counter-pressure p acts directly on the cross sectional surface of the closure member #14 " (page3□[0057] line 3-5) and does not act on all surface of the air flow side of the closure member #14, so the force of "counter-pressure p" is only related to the speed of air flow and do not related to the pressure of air flow. It can be clearly seen from Fig. 2 and Fig. 5 that the two sides of the closure member #14 are connected. The pressure of the two sides of the closure member #14 should be the same. And there is no force of pressure acting on the closure member #14. It can be clearly seen on Fig. 2 of Schumacher (US2002/0175022) that the mode and kind of the force which air flow acts on closure member #14 is just the same as NEW(US733 330). This just like the force acting on a sailing boat. This kind of force does not include any element of pressure, it is only related to the speed of air flow. The speed of air flow and the pressure of air flow are connected, but the structure of Schumacher and NEW and sail is only response to speed of air flow, but do not responsive to pressure of air flow. Neither Schumacher nor NEW teach a throttling device which respond to pressure of air flow. Thus, Schumacher and NEW cannot disclose Claim 1 of present application.

For a throttling device with variable mode so that the cross sectional area of throttling device reduces when pressure increases (that is exhaust flux increase) to be installed in a muffler, two problems must be solved first. One problem is the vicious cycle, which causes the throttling device to stop at position of the least cross sectional area and cannot be adjusted. The other problem is serious back pressure that reduces engine power. It is not obvious and creative work is required to solve these problems. If a

skilled artisan changes the control from the speed to the pressure, the device in NEW must close H, H' and the device will not open, there is no cycle.

The throttling device H, H' of NEW respond to the force of spring F#2' and funnel-mouth #G. During the exhaust-stroke, air flow speed at funnel-mouth #G is high and it will close H, H', the exhaust-gases are unable to escape from the chamber #B. After the exhaust-stroke air flow speed at funnel-mouth #G reduces to zero, the spring F#2' will open H, H' and the exhaust-gases are enable to escape to the atmosphere. With the control of speed, there is a cycle. Now, if an operator changes the control from the speed to the pressure, when the exhaust-stroke pressure increases and closes H, H', the exhaust-gases are unable to escape from the chamber #B. After the exhaust-stroke, the pressure will not come down because the exhaust-gases are unable to escape from the chamber #B. H, H' will not open and the exhaust-gases are unable to escape to the atmosphere. There is no cycle. Even if the throttling device is not closed, when pressure increases, the cross sectional area of throttling device reduces. Then when the cross sectional area of throttling device reduces, the throttle effect increases. When the throttle effect increases, the pressure will also increase. When pressure increases, the cross sectional area of throttling device reduces, and so on. It is a vicious cycle. The throttling device must stop at position of the least cross sectional area. Under this condition, the throttling device cannot be adjusted and cannot be a throttling device in responsive to pressure.

The outlet pressure of a muffler is lower than inlet. In other words, there is a pressure decrease between inlet and outlet. This is the back pressure of a muffler. Back pressure will reduce the power of engine (power loss) and then reduce the efficiency of energy. The pressure decrease between inlet and outlet of a muffler is an undesirable side effect, it is not a function of muffler. The inventors did their best to avoid it. The average pressure of an engine exhaust is not high, and it does not need a pressure reducer. The noise of exhaust comes from the pulse of air flow. Muffling is a process of averaging pulse. The most useful method of averaging pulse is expansion. In theory, the volume of expansion chamber is N times to the volume of cylinder, the peak value of pulse will reduce by N times. But as there is an outlet, the expansion is not enough and there is not

N times. To achieve acceptable muffling effect, a large expansion volume is required. Otherwise, it will create noise (NEW page1 line26—31). Thus throttling device in muffler is set for better expansion. However, the throttling device brings a problem of back pressure to reduce engine power. There are great differences between the full load high speed engine condition and off load low speed engine condition. The throttling device sets to meet the demand of back pressure when large exhaust flux will bring about exhaust noise (insufficient muffling) when little exhaust flux. The throttling device sets to meet sufficient muffling when little exhaust flux will bring about problem of undesirable back pressure when large exhaust flux. To solve the conflict between back pressure and muffling effect, multifarious variable throttling device is installed in muffler. Through search, it is found that all throttling device but NEW are with variable mode which the cross sectional area of throttling device increases when exhaust flux increases (with fix pipeline exhaust flux increase means pressure increase). If we adopt the variable throttling device that the cross sectional area reduces when exhaust pressure increases (that is flux increase), it is clear that the muffler must be at the least cross sectional area of throttling device when the most exhaust flux—this means the largest back pressure and the least engine power.

For a throttling device with variable mode so that the cross sectional area of throttling device reduces when pressure increases (that is exhaust flux increase) to be installed in a muffler, two problems must be solved first. One problem is the vicious cycle, which causes the throttling device to stop at position of the least cross sectional area and can't adjusted. The other problem is serious back pressure that reduces engine power. It is not obvious and creative work is required to solve these problems.

Creatively introducing the theory of selective throttling, the inventors of the present invention uses the throttling effect of a throttling device in a muffler. This is the technical prerequisite for installing a throttling device with variable mode so that the cross sectional area of throttling device reduces when exhaust pressure increases.

In the present invention, the peaks of the gas flow wave are selectively throttled, while the wave valleys of the gas flow are not. The throttled wave peaks are kept at the

gas inlet and previous channels to elevate the wave valleys. After the process of reducing peaks and filling in valleys, the shape of the gas flow wave is completely changed to basically straight. Selectively throttling is only throttling the gas flow instantaneously, without throttling the average gas flow. This characteristics of selectively throttling solve the problem of vicious cycle of stopping at the least volume position. At the same time, selectively throttling changes the function of throttling device on air flow route just like changing a resistance to a diode in electronic field. By commutating the shape of the gas flow wave like AC power to be DC power, the shape of the gas flow wave is completely changed from curves to a basically straight line. This is the muffling effect of a perfect dream-muffler. In theory, there is no back pressure in the muffler of present invention, the inventors set the pressure of the balancing point at the average pressure of the inlet air flow. The pulse waveform whose pressure is greater than the average pressure will be intercepted to filling in the pulse waveform whose pressure is lower than the average pressure. Because of the pulse waveform whose pressure is greater than the average pressure and those of lower pressure than must be equal, so the pressure of the outlet will keep at the average pressure of the inlet air flow. In other words, the inlet pressure is equal to the outlet pressure--- NO back pressure. This solves the problem of undesirable back pressure to reduce engine power. In practice, the muffler of the present invention absolutely eliminates (an operator can't hear any exhaust noise where his/her ear is within 2 inches from the outlet of exhaust pipe). The exhaust noise of a 186 single cylinder diesel engine is reduced without any more power lost. In theory, the muffler of present invention is a perfect muffler.

Selectively throttling is only throttling the peaks of the gas flow wave, while the wave valleys of the gas flow are not. Selectively throttling is only throttling the gas flow instantaneously, without throttling the average gas flow. Difference between throttling and selectively throttling is significant. Selectively throttling makes the throttling device, which is not the muffling effect in prior art. The present invention achieves the effect of a perfect dream-muffler (absolutely eliminating the noise of air flow without any back pressure), and also solves the world-class problem of muffling low frequency noise. Selectively throttling requires creative work.

Throttling does not have muffling effect. Throttling effects to the gas flow only reduce the ratio as shown from the gas flow wave chart, and will not change the shape of the gas flow wave, so there is no muffling effect. The throttling device in prior art is used for assisting muffling through expansion and has undesirable side effect of back pressure, and it cannot reach muffling effect alone. On the contrary, the present invention deletes all muffling structures which are necessary in prior art and the present invention only uses throttling device to reach muffling effect, which is non-obvious.

Pressure reducing valves is a kind of standard production. In U.S., there are several standard about pressure reducing valves:

ANSI/ASSE 1003 (Water Pressure Reducing Valves for Domestic Water Supply System)

ASTM F 1795 (Standard Specification for Pressure-Reducing Valves for Air or Nitrogen Systems)

ASTM F 1565 (Standard Specification for Pressure-Reducing Valves for Steam Service)

UL 1468 (Direct acting pressure reducing and pressure restricting valves)

These standards all have definitions to a Pressure Reducing Valve. Fig 1 of present application is also a schematic drawing showing the structural principle of a Pressure Reducing Valves. The structure of Schumacher and NEW cannot reduce pressure under static(non-flowing) condition, they are not structure of pressure reducing valves

Due to above indicated differences, there is no motivation or reasonable expectation of success to combine New with Schumacher and/or Murray. Therefore, Even if they are combined, a person of ordinary skill in the art will not discern the present invention at time of its invention.

Therefore, the newly presented claims are not obvious over New in view of Schumacher and/or Murray. The rejection under 35 U.S.C. § 103 has been overcome.

Accordingly, withdrawal of the rejections under 35 U.S.C. § 103 is respectfully requested.

Having overcome all outstanding grounds of rejection, the application is now in condition for allowance, and prompt action toward that end is respectfully solicited.

Respectfully submitted,

JACOBSON HOLMAN PLLC

Date: April 9, 2008
(202) 638-6666
400 Seventh Street, N.W.
Washington, D.C. 20004
Atty. Dkt. No.: P70465US0

By _____
John C. Holman
Registration No. 22,769